A Project Report on

Automatic Medicine Reminder Device

(A dissertation submitted in partial fulfilment of the requirements of Bachelor of Technology in Electronics & Communication Engineering of the West Bengal University of Technology, West Bengal)

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Certificate of Approval

This is to certify that the project report on **"Automatic Medicine Reminder Device"** is a record of bonafide work, carried out by **our Group members** under my guidance and supervision.

In my opinion, the report in its present form is in conformity as specified by Global Institute of Management & Technology and as per regulations of the Maulana Abul Kalam Azad University. To the best of my knowledge the results presented here are original in nature and worthy of incorporation in project report for the B.Tech. program in Electronics & Communication in the academic year 2023-2024.

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External Invigilator   Guide   Head, Dept of ECE

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ACKNOWLEGEMENTS

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ABSTRACT

The Automatic Medicine Reminder Device (AMRD) project aims to address the challenge of medication adherence, particularly for individuals with chronic conditions or complex medication regimens. Medication non-adherence remains a significant issue in healthcare, leading to adverse health outcomes, increased healthcare costs, and decreased overall well-being. The AMRD project introduces an innovative solution to enhance medication adherence through the integration of smart technology into the daily lives of patients.

The key components of the AMRD include a portable electronic device, a mobile application, and a cloud-based platform. The device is designed to securely store and dispense medication at scheduled times, ensuring accurate dosage and timely administration. The mobile application serves as a user-friendly interface, allowing patients to set up personalized medication schedules, receive real-time reminders, and track their adherence progress. The cloud-based platform facilitates data storage, analysis, and communication between the device and the user's mobile application, creating a seamless and connected healthcare ecosystem

Key Features:

1. **Automated Medication Dispensing:** The AMRD device incorporates a secure medication compartment and a dispensing mechanism controlled by a microcontroller. It accurately dispenses the prescribed dosage at predetermined times, eliminating the risk of human error and promoting medication adherence.

2. **Customizable Reminders:** The mobile application provides users with the flexibility to customize medication schedules based on their unique prescription plans. Users can receive reminders through push notifications, ensuring they never miss a dose and promoting consistent adherence.

3. **User-Friendly Interface:** The mobile application features an intuitive interface, making it easy for users to input medication details, update their schedules, and track their adherence history. The application also allows users to receive educational content related to their medications and health conditions.

INTRODUCTION

Medication adherence is a critical factor in the effective management of chronic conditions and overall healthcare outcomes. However, the complexities of modern life often lead to challenges in maintaining a consistent and accurate medication routine. Automatic Medicine Reminder Devices (AMRDs) have emerged as innovative solutions to address this issue by integrating smart technology into healthcare practices. The AMRD project presented in this document aims to contribute to the enhancement of medication adherence through the development of a sophisticated, user-friendly, and automated system.

In recent years, advancements in electronics, microcontrollers, and connectivity have paved the way for the integration of smart devices into various aspects of healthcare. The AMRD project capitalizes on these technological strides to create a comprehensive solution that goes beyond conventional pill organizers and manual reminders. By incorporating a portable electronic device, a mobile application, and a cloud-based platform, the AMRD seeks to provide a holistic approach to medication management.

The prevalence of chronic diseases and the aging population highlight the increasing need for effective medication adherence strategies. Poor adherence not only jeopardizes individual health but also contributes to the rising healthcare costs associated with preventable complications. The AMRD project recognizes the potential of technology to empower individuals in managing their health, offering a proactive and intelligent solution to bridge the gap between prescribed treatments and patient compliance.

This document outlines the key features of the AMRD, emphasizing its automated medication dispensing capabilities, customizable reminders, and user-friendly interfaces. The integration of cloud connectivity allows for real-time data exchange, enabling healthcare providers to monitor and intervene when necessary. The project envisions a future where smart healthcare solutions, such as the AMRD, play a pivotal role in improving medication adherence, enhancing patient outcomes, and ultimately contributing to a more efficient and sustainable healthcare system.

THEORETICAL BACKGROUND

Hardware properties

1.　Arduino Uno Module:
The Arduino UNO is a standard board of Arduino. Here UNO means 'one' in Italian. It was named as UNO to label the first release of Arduino Software. It was also the first USB board released by Arduino. It is considered as the powerful board used in various projects. Arduino.cc developed the Arduino UNO board.

Arduino UNO is based on an ATmega328P microcontroller. It is easy to use compared to other boards, such as the Arduino Mega board, etc. The board consists of digital and analog Input/Output pins (I/O), shields, and other circuits.

The Arduino UNO includes 6 analog pin inputs, 14 digital pins, a USB connector, a power jack, and an ICSP (In-Circuit Serial Programming) header. It is programmed based on IDE, which stands for Integrated Development Environment. It can run on both online and offline platforms.

The IDE is common to all available boards of Arduino.
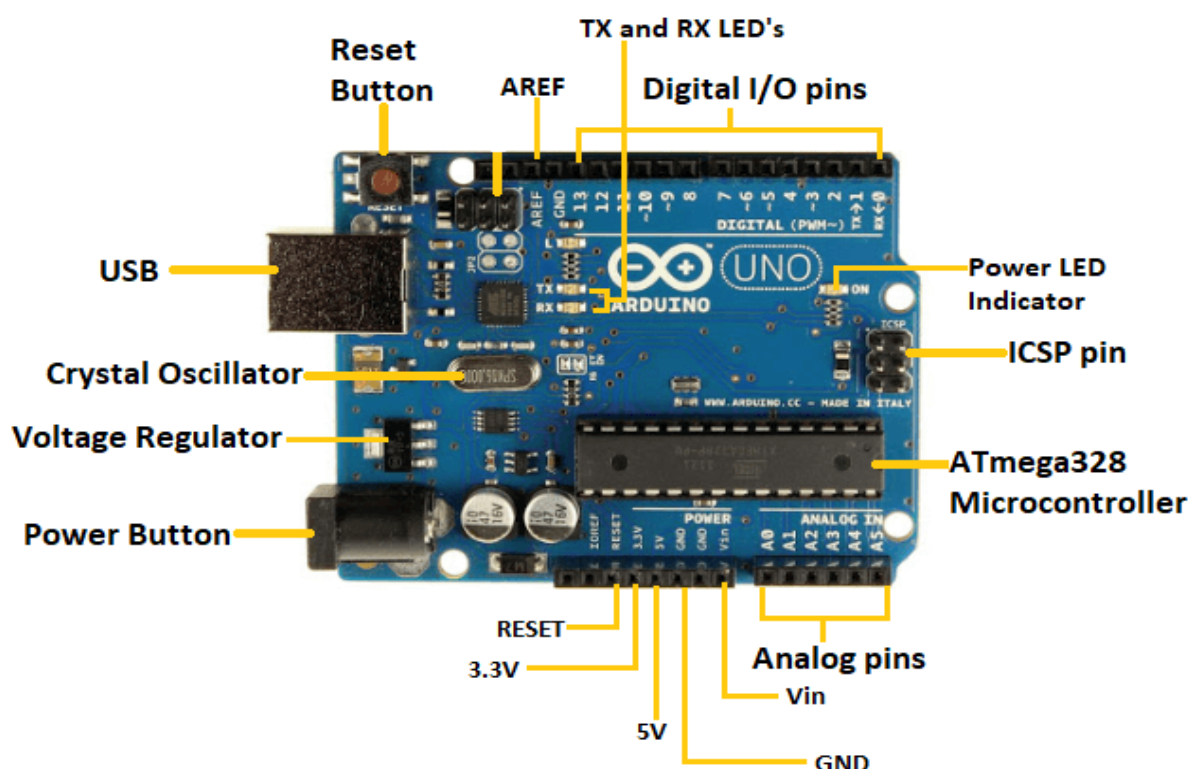
2. Bread board:

The breadboard is a white rectangular board with small embedded holes to insert electronic components. It is commonly used in electronics projects. We can also say that breadboard is a prototype that acts as a construction base of electronics.

A breadboard is also categorized as a **Solderless board**. It means that the component does not require any soldering to fit into the board. Thus, we can say that breadboard can be reused. We can easily fit the components by plugging their end terminal into the board. Hence, a breadboard is often called a **plugboard**.
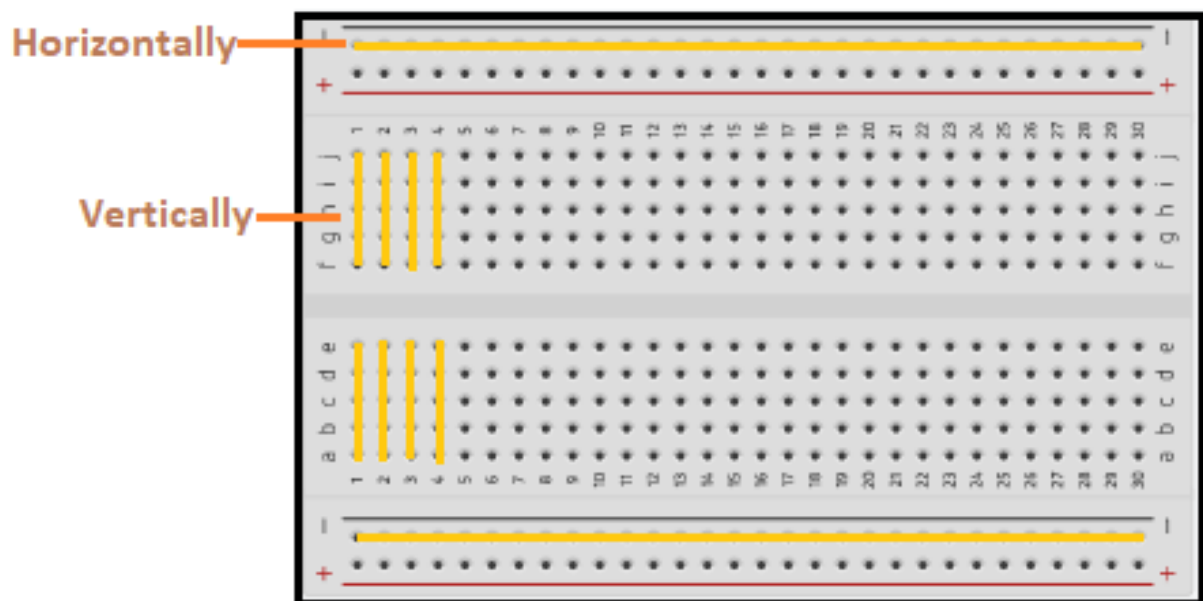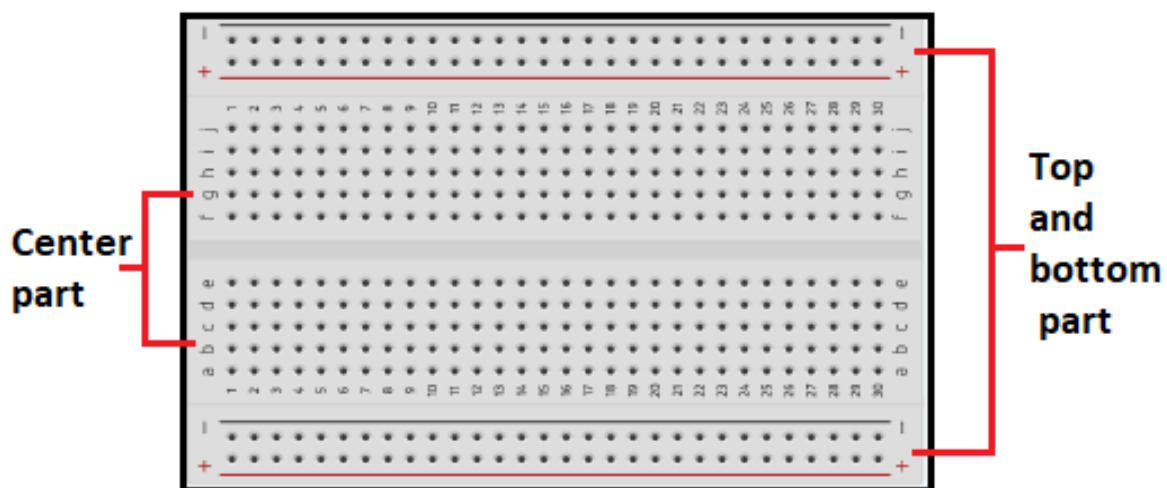
3.DS3231 RTC MODULE:
The DS3231 is a low-cost, extremely accurate I2C real-time clock (RTC) with an integrated temperature- compensated crystal oscillator (TCXO) and crystal. The device incorporates a battery input, and maintains accurate timekeeping when main power to the device is interrupted.

RTC module detects a voltage drop of the main power supply and automatically switches to a backup power supply for operation. while the MOS switch suppresses leakage current and voltage drops, enabling efficient power management of the entire system compared to diode OR circuits.
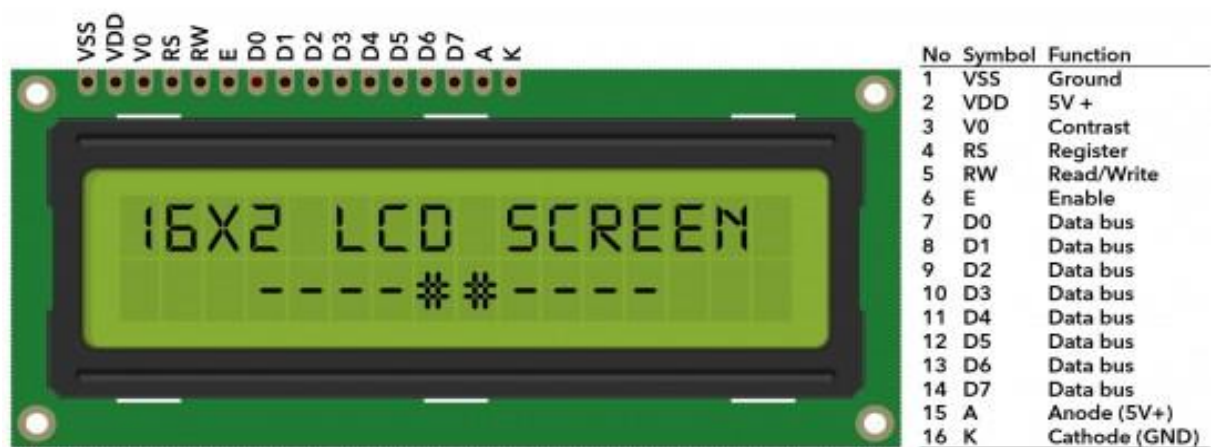
SDA is a serial data pin for the I2C interface. VCC provides power to the module. You can connect it to a 3.3 to 5 volt power supply.

When the module's power is interrupted, the device has a battery input and keeps a precise time. The device's long-term precision is improved by the inclusion of the crystal oscillator. The RTC keeps track of seconds, minutes, hours, days, dates, months, and years.
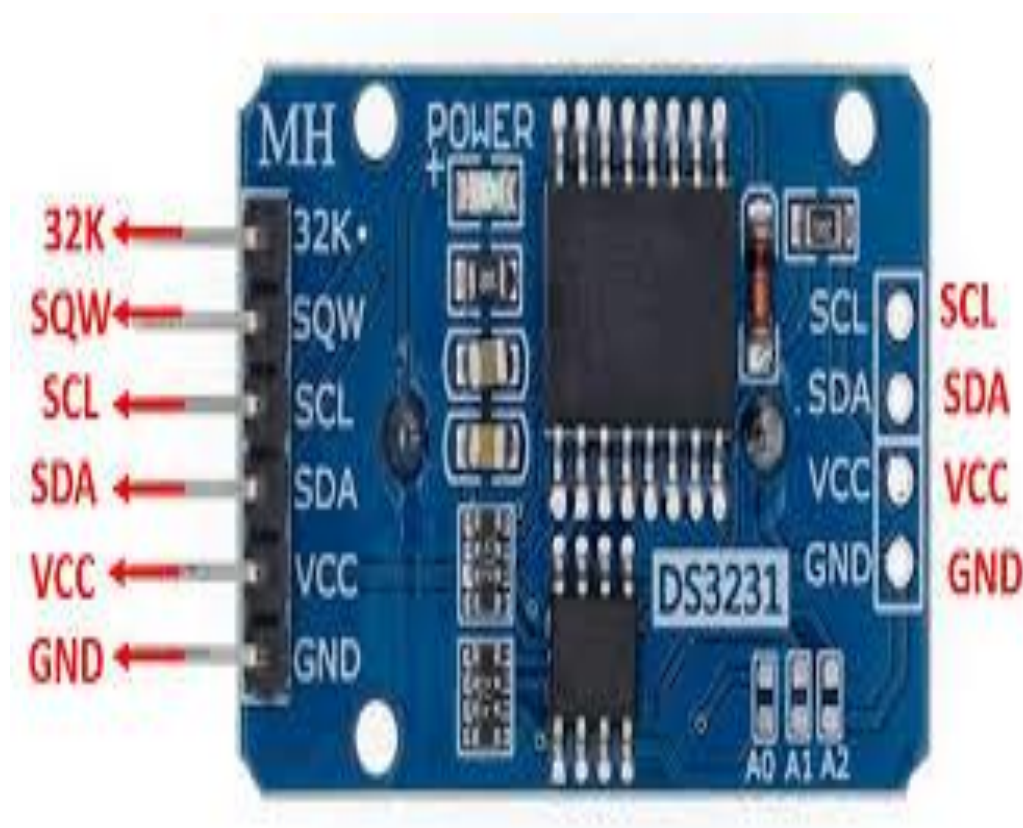
4. 16*2 LCD Display:

An LCD (Liquid Crystal Display) screen is an electronic display module and has a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. A 16x2 LCD means it can display 16 characters per line and there are 2 such lines.

The second pin is the VCC which we connect the 5 volts pin on the Arduino Board. Next is the Vo pin on which we can attach a potentiometer for controlling the contrast of the display. Next, The RS pin or register select pin is used for selecting whether we will send commands or data to the LCD.

No	Symbol	Function
1	VSS	Ground
2	VDD	5V +
3	V0	Contrast
4	RS	Register
5	RW	Read/Write
6	E	Enable
7	D0	Data bus
8	D1	Data bus
9	D2	Data bus
10	D3	Data bus
11	D4	Data bus
12	D5	Data bus
13	D6	Data bus
14	D7	Data bus
15	A	Anode (5V+)
16	K	Cathode (GND)

4.POTENTIOMETER:
A potentiometer is an electronic device that measures the EMF (electromotive force) of a cell as well as the cell's internal resistance. It's also used to compare the EMFs of various cells. In most applications, it may also be used as a variable resistor.

A potentiometer comprises a long wire with a uniform space of the cross area. Normally the wire is comprised of manganin or constantan. Sometimes the wire might be cut into certain pieces and each piece is associated toward the end focuses through a thick metallic strip. Typically it will be copper strips. Each piece of wire has a length of one meter. For the most part, there will be six bits of wire and the all-out length of the wire is six meters. For the most part the length of the wire shifts from 4 m to 10 m. The more the length of the wire, the better the precision of the potentiometer.

The potentiometer comprises a driving circuit that comprises a battery, key and rheostat. It additionally comprises a galvanometer and a rider. The end focuses or the terminals of the potentiometer are associated with the focuses where the potential contrast is to be estimated.
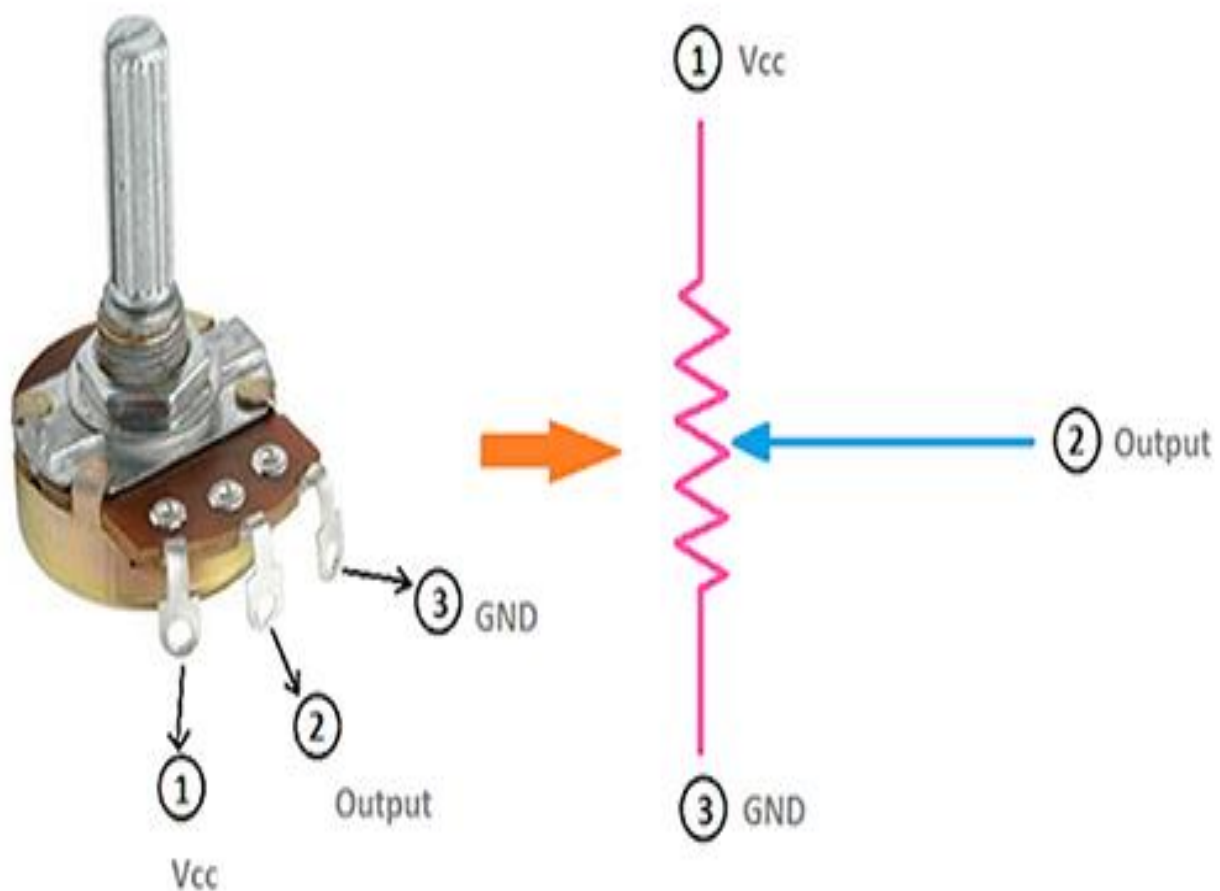
6.PUSH BUTTON:
A push button switch is a mechanical device used to control an electrical circuit in which the operator manually presses a button to actuate an internal switching mechanism.

7.RESISTOR:
A resistor is a passive two-terminal electrical component that implements electrical resistance as a circuit element. In electronic circuits, resistors are used to reduce current flow, adjust signal levels, to divide voltages, bias active elements, and terminate transmission lines, among other uses.

Band A 1st Digit **Band B** 2nd Digit **Band C** Multiplier **Band D** % Tolerance
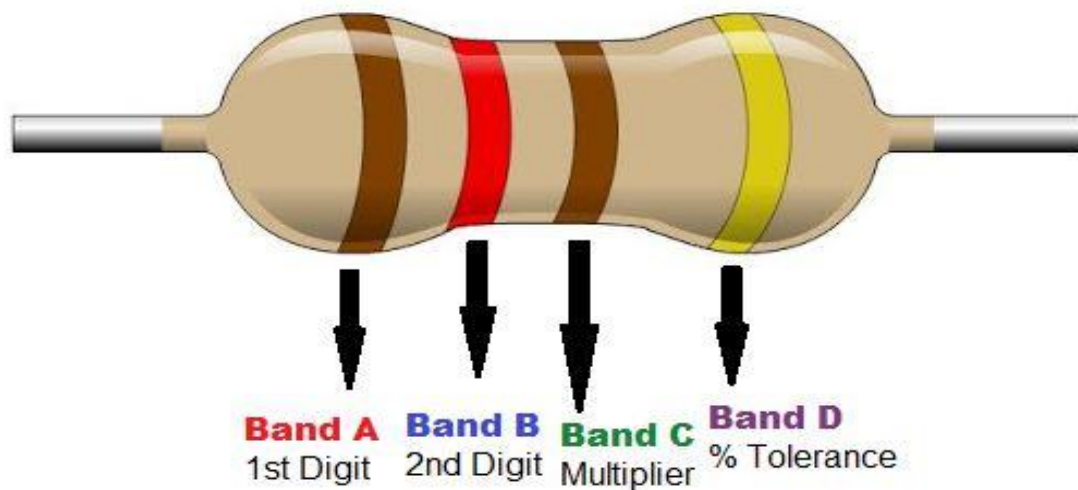
8.BUZZER: An audio signaling device like a beeper or buzzer may be electromechanical or piezoelectric or mechanical type. The main function of this is to convert the signal from audio to sound. Generally, it is powered through DC voltage and used in timers, alarm devices, printers, alarms, computers, etc. Based on the various designs, it can generate different sounds like alarm, music, bell & siren.

Negative (-)   Possitive (+)

9.USB CABLE: The term USB stands for "Universal Serial Bus". USB cable assemblies are some of the most popular cable types available, used mostly to connect computers to peripheral devices such as cameras, camcorders, printers, scanners, and more.

10.JUMPER WIRE:A jump wire is an electrical wire, or group of them in a cable, with a connector or pin at each end, which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering.


11.SINGLE STAND WIRE: Single-strand wire consists of a length of metal wire, usually wrapped in a protective sheath. A single core wire is a single core wire with an insulator. It is available in small diameters. Single stand wire is easy to make such a cable and can be used where flexibility is not important eg.
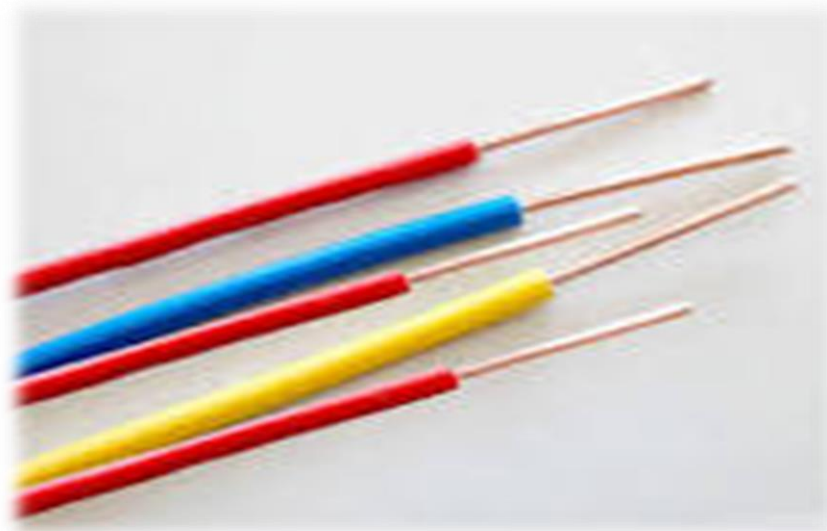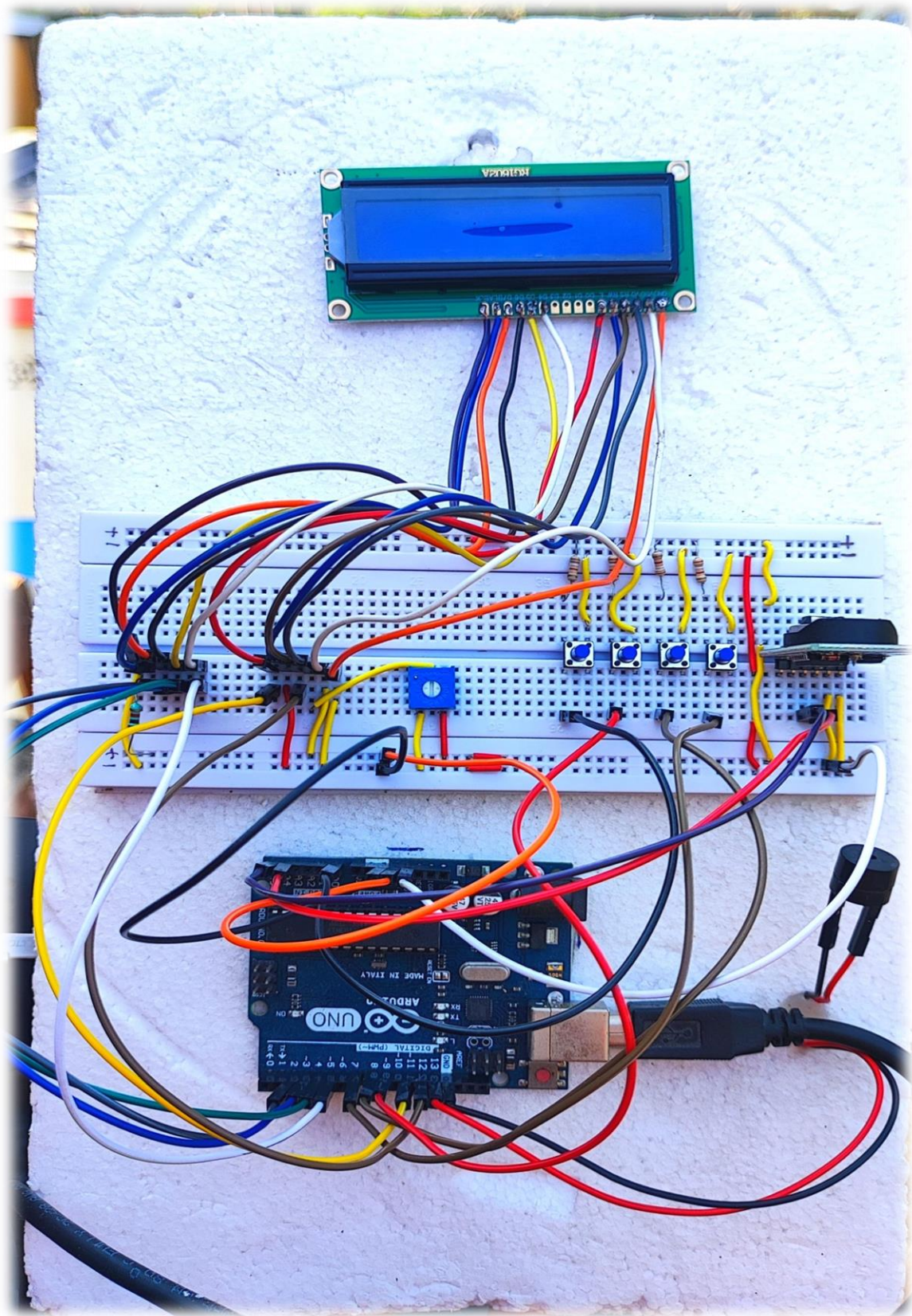
CIRCUIT DIAGRAM

Circuit-Diagram-Arduino-Based-Medicine-Reminder-System
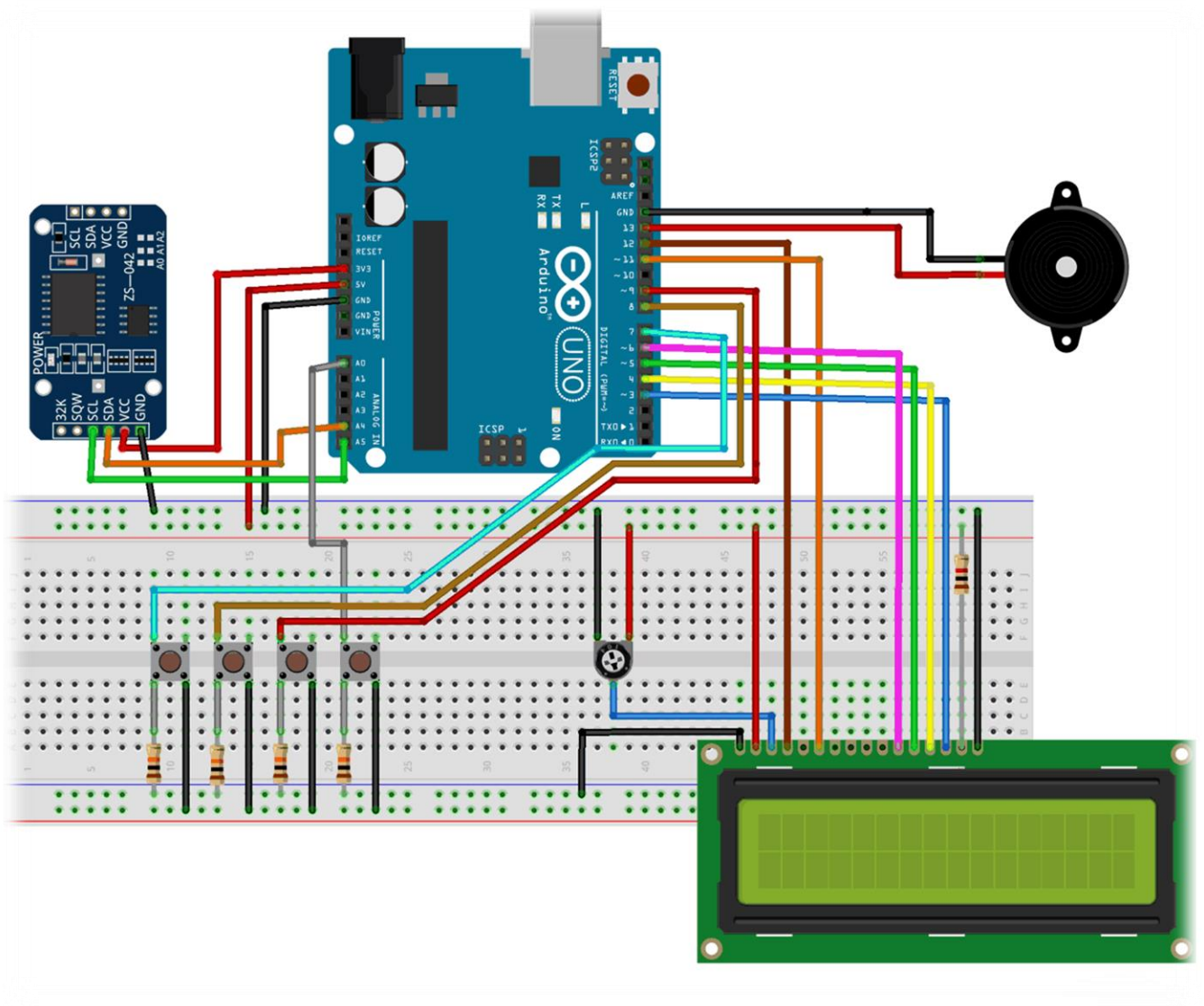
HARDWARE IMAGE

RESULTS

The stage of the project module is developing now ,so after the completion of this project we will share all about Test results and code.

CONCLUSION

In this paper a low-cost, useful model for an automatic Medicine reminder device has been designed using simple electronics applications. For easy detection and alert, a buzzer and a LCD display has been attached so that the person in concern takes his Medicine in time in the right quantity without personalized supervision. The device also records the time and date of taking Medicine as a useful database for future medical consultation. Family members are alerted, if Medicine are not taken on time. This easy-to-use device can be a convenient option for households where family members have work-hour compulsions or are compelled to keep a mistress for the member with medical complications.

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